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| MICHAEL C. POPHAL EVEREADY BATTERY COMPANY INC 25225 DETROIT ROAD P O BOX 450777 WESTLAKE, OH 44145 | | | EXAMINER LEWIS, BEN | |
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/713,833
Filing Date: November 14, 2003
Appellant(s): MOORE ET AL.

Kevin T. Grzelak
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 12th, 2008 appealing from the Office
action mailed December 13th, 2007

Real party in Interest

- (1) A statement identifying the real party in interest is contained in the brief.

(2) ***Related Appeals and Interferences***

There are no related Appeals and Interferences to this Appeal.

(3) ***Status of Claims***

The statement of the status of the claims contained in the brief is correct.

(4) ***Status of Amendments After Final***

The appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) ***Summary of Claimed Subject Matter***

The summary of claimed subject matter contained in the brief is correct.

(6) ***Grounds of Rejection to be Reviewed on Appeal***

The appellant's statement of the grounds of rejection in the brief is correct.

(7) ***Claims Appendix***

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

| Number | Name | Date |
|--------------------|-------------------|----------------------------------|
| US 2004/0115532 A1 | Malservisi et al. | August 5 th , 2003 |
| US 5,209,995 | Tada et al. | August 21 st , 1991 |
| US 2004/0033418 | Armacanqui et al. | February 27 th , 2003 |

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

Claims 1-4, 9-13, 16, 40-44, 47 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malservisi et al. (U.S. Pub. No. 2004/0115532 A1) in view of Tada et al. (U.S. Patent No. 5,209,995).

With respect to claims 1, 9, 12, 40 and 43, Malservisi et al disclose zinc powders for use in electrochemical cells (title). Malservisi et al. also disclose, an LR-06 electrochemical cell comprising a positive terminal fabricated from a conductive material, a manganese dioxide cathode in electrical contact with the positive terminal, an anode comprising a battery grade zinc powder, the zinc powder being suspended in a gelled KOH electrolyte, a separator electronically separating the cathode and the anode, and a current collector inserted into the anode (Paragraph 0023).

With respect to the electrode having less than 50ppm of mercury, Malservisi et al teach that alkaline cell technology has evolved significantly over the past 10 years or so. For instance, lower mercury and mercury-free cells were introduced in the 90's (Paragraph 0003).

With respect to the zinc powder having a tap density greater than 2.8g/cc and less than 3.65g/cc, Malservisi et al. teach the use of a battery grade zinc powder comprising stranded particles fabricated from a zinc metal, the stranded particles having a tap density of at most about 3.2 g/cc, preferably at most about 2.8 g/cc (Paragraph 0015).

With respect to the zinc powder occupying less than 28.0 volume percent of said second electrodes volume. Malservisi et al. teach that two varieties of gelled anodes

were fabricated, the first comprising 67% by weight zinc powder and 33% by weight gelled electrolyte and the second comprising 62% by weight zinc powder and 38% by weight gelled electrolyte. The control anode was fabricated from 67% by weight zinc powder and 33% by weight of gelled electrolyte. The gelled electrolyte comprised 98% by weight of KOH 40%/ZnO 3% and 2% by weight of polyacrylic acid (Carbopol TM 940) as gelling agent (Paragraph 0080-0081).

$$\rho_{\text{(Zinc)}} = 7.14\text{g/cc}, \rho_{\text{(KOH 40\%)}} = 1.39\text{g/cc}, \rho_{\text{(ZnO)}} = 5.6\text{g/cc}, \rho_{\text{(Carbopol 940)}} = 1.41\text{g/cc}$$

Basis = 100g anode material

$$\text{Volume Zn} = 62\text{g} / \rho_{\text{(Zinc)}} = 8.6\text{cc}, \text{Volume KOH} = (0.98 * 38\text{g}) / \rho_{\text{(KOH)}} = 27.9\text{cc}$$

$$\text{Volume Carbopol 940} = (0.02 * 38\text{g}) / \rho_{\text{(carbopol 940)}} = 0.54\text{cc}$$

$$\text{Volume \% Zinc} = (\text{Vol zn} / \text{Vol}) \times 100 = 23.2 \text{ vol \% zinc}$$

With respect to the BET surface area being greater than 400 cm²/g, Malservisi et al do not disclose BET specific surface area data. However, Tada et al. recognize the benefit of changing the surface area of zinc particles. Tada et al. disclose zinc alkaline cells (title) wherein If the bulk specific gravity of the zinc alloy powder would be less than 2.90 (grams per cm.sup.3), on the one hand, the action of suppressing gases from generating may be reduced because the shapes of the zinc alloy powder particles may become so nearly acicular that the specific surface area of the zinc alloy powder particles becomes large enough to make their reactivity too high. If the bulk specific gravity thereof would be larger than 3.50 (grams per cm.sup.3), on the other hand, the discharge performance may be lowered because the shapes of the zinc alloy powder particles become so nearly spherical that their surface area becomes smaller, thereby

making their reactivity too low (Col 2 lines 40-54). Therefore, it would have been within the skill of the ordinary artisan to change the surface area of the zinc particles of Malservisi et al. such that the surface area is within the range of that claimed by applicant in order to provide sufficient reactivity. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

With respect to claims 2-4 and 51, Malservisi et al. teach that two varieties of gelled anodes were fabricated, the first comprising 67% by weight zinc powder and 33% by weight gelled electrolyte and the second comprising 62% by weight zinc powder and 38% by weight gelled electrolyte. The control anode was fabricated from 67% by weight zinc powder and 33% by weight of gelled electrolyte. The gelled electrolyte comprised 98% by weight of KOH 40%/ZnO 3% and 2% by weight of polyacrylic acid (Carbopol™ 940) as gelling agent (Paragraph 0080-0081).

$$\rho_{\text{(Zinc)}} = 7.14\text{g/cc}, \rho_{\text{(KOH 40\%)}} = 1.39\text{g/cc}, \rho_{\text{(ZnO)}} = 5.6\text{g/cc}, \rho_{\text{(Carbopol 940)}} = 1.41\text{g/cc}$$

Basis = 100g anode material

$$\text{Volume Zn} = 62\text{g} / \rho_{\text{(Zinc)}} = 8.6\text{cc}, \text{Volume KOH} = (0.98 * 38\text{g}) / \rho_{\text{(KOH)}} = 27.9\text{cc}$$

$$\text{Volume Carbopol 940} = (0.02 * 38\text{g}) / \rho_{\text{(carbopol 940)}} = 0.54\text{cc}$$

$$\text{Volume \% Zinc} = (\text{Vol zn} / \square \text{Vol}) \times 100 = 23.2 \text{ vol \% zinc}$$

With respect to claims 41-42, Malservisi et al. teach the use of a battery grade zinc powder comprising stranded particles fabricated from a zinc metal, the stranded particles having a tap density of at most about 3.2 g/cc, preferably at most about 2.8 g/cc (Paragraph 0015). Malservisi et al. teach that two varieties of gelled anodes were fabricated, the first comprising 67% by weight zinc powder and 33% by weight gelled electrolyte and the second comprising 62% by weight zinc powder and 38% by weight gelled electrolyte. The control anode was fabricated from 67% by weight zinc powder and 33% by weight of gelled electrolyte. The gelled electrolyte comprised 98% by weight of KOH 40%/ZnO 3% and 2% by weight of polyacrylic acid (Carbopol TM 940) as gelling agent (Paragraph 0080-0081).

Malservisi et al do not disclose resistivity data. However, it is the position of the examiner that such properties are inherent, given that Malservisi et al and the present application utilize the same materials and same anode composition. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claims 10-11, Malservisi et al. teach the use of a battery grade zinc powder comprising stranded particles fabricated from a zinc metal, the stranded

particles having a tap density of at most about 3.2 g/cc, preferably at most about 2.8 g/cc (Paragraph 0015).

With respect to claims 13 and 44, Malservisi et al. teach the use of a battery grade zinc powder comprising stranded particles fabricated from a zinc metal, the stranded particles having a tap density of at most about 3.2 g/cc, preferably at most about 2.8 g/cc (Paragraph 0015). Malservisi et al. teach that two varieties of gelled anodes were fabricated, the first comprising 67% by weight zinc powder and 33% by weight gelled electrolyte and the second comprising 62% by weight zinc powder and 38% by weight gelled electrolyte. The control anode was fabricated from 67% by weight zinc powder and 33% by weight of gelled electrolyte. The gelled electrolyte comprised 98% by weight of KOH 40%/ZnO 3% and 2% by weight of polyacrylic acid (Carbopol TM 940) as gelling agent (Paragraph 0080-0081).

Malservisi et al do not disclose any KOH absorption data. However, it is the position of the examiner that such properties are inherent, given that Malservisi et al and the present application utilize the same materials and same anode composition. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claims 16 and 47, Malservisi et al. teach that the zinc powder comprises particles fabricated from a zinc alloy, the alloy consisting essentially of zinc, aluminum, bismuth and indium (Paragraph 0018). For ppm values see Table 4.

TABLE 4

| Atomization process | Alloy Chemistry (ppm) | | | | ZnO | |
|---|-----------------------|-----|-----|----|---------|--------------------|
| | Al | Bi | Is | Pb | ZnO (%) | Ratio to Reference |
| Impulse atomisation process (strand shaped) | 50 | 100 | 200 | | 0.03 | 0.25 |
| | 70 | 100 | 200 | | 0.04 | 0.33 |
| | 60 | 100 | 200 | | 0.03 | 0.25 |
| | 75 | 100 | 200 | | 0.02 | 0.17 |
| Conventional air atomisation | 100 | 100 | 200 | | 0.12 | 1 |
| Impulse atomisation process (strand shaped) | | 300 | 300 | | 0.08 | 0.15 |
| | | 300 | 300 | | 0.16 | 0.30 |
| | | 300 | 300 | | 0.09 | 0.17 |
| | | 300 | 300 | | 0.54 | 1 |
| Conventional air atomisation | | | | | | |

Claims 24, 25, 30, 31, 35, 36 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malservisi et al. (U.S. Pub. No. 2004/0115532 A1) in view of Tada et al. (U.S. Patent No. 5,209,995).

With respect to claims 24, 25, 30, 31, 35 and 36, Malservisi et al disclose zinc powders for use in electrochemical cells (title). Malservisi et al. also disclose, an LR-06 electrochemical cell comprising a positive terminal fabricated from a conductive material, a manganese dioxide cathode in electrical contact with the positive terminal, an anode comprising a battery grade zinc powder, the zinc powder being suspended in

a gelled KOH electrolyte, a separator electronically separating the cathode and the anode, and a current collector inserted into the anode (Paragraph 0023).

With respect to the electrode having less than 50ppm of mercury, Malservisi et al teach that alkaline cell technology has evolved significantly over the past 10 years or so. For instance, lower mercury and mercury-free cells were introduced in the 90's (Paragraph 0003).

With respect to the zinc powder having a tap density greater than 2.8g/cc and less than 3.65g/cc, Malservisi et al. teach the use of a battery grade zinc powder comprising stranded particles fabricated from a zinc metal, the stranded particles having a tap density of at most about 3.2 g/cc, preferably at most about 2.8 g/cc (Paragraph 0015).

With respect to the zinc powder occupying less than 28.0 volume percent of said second electrodes volume. Malservisi et al. teach that two varieties of gelled anodes were fabricated, the first comprising 67% by weight zinc powder and 33% by weight gelled electrolyte and the second comprising 62% by weight zinc powder and 38% by weight gelled electrolyte. The control anode was fabricated from 67% by weight zinc powder and 33% by weight of gelled electrolyte. The gelled electrolyte comprised 98% by weight of KOH 40%/ZnO 3% and 2% by weight of polyacrylic acid (Carbopol TM 940) as gelling agent (Paragraph 0080-0081).

$$\rho_{\text{(Zinc)}} = 7.14\text{g/cc}, \rho_{\text{(KOH 40\%)}} = 1.39\text{g/cc}, \rho_{\text{(ZnO)}} = 5.6\text{g/cc}, \rho_{\text{(Carbopol 940)}} = 1.41\text{g/cc}$$

Basis = 100g anode material

$$\text{Volume Zn} = 62\text{g} / \rho_{\text{(Zinc)}} = 8.6\text{cc}, \text{Volume KOH} = (0.98 * 38\text{g}) / \rho_{\text{(KOH)}} = 27.9\text{cc}$$

$$\text{Volume Carbopol 940} = (0.02 \times 38\text{g}) / \rho_{(\text{carbopol 940})} = 0.54\text{cc}$$

$$\text{Volume \% Zinc} = (\text{Vol zn} / \square \text{Vol}) \times 100 = 23.2 \text{ vol \% zinc}$$

Malservisi et al. does not specifically teach that the second electrode comprises no more than 4.3 grams of zinc powder. However, it would have been obvious to one of ordinary skill in the art to produce an electrode with the amount of zinc powder as claimed by applicant at the time the invention was made because the amount of electrode active material in batteries vary according to the required battery capacity.

With respect to the cell OCV, Malservisi et al. teach the use of a battery grade zinc powder comprising stranded particles fabricated from a zinc metal, the stranded particles having a tap density of at most about 3.2 g/cc, preferably at most about 2.8 g/cc (Paragraph 0015). Malservisi et al. also teach that a given mixture is comprised of two or more types of zinc powders made by impulse atomization or by impulse atomization and conventional techniques and having different particle shapes and/or particle sizes distributed around different mean particle sizes which are then combined to form a hybrid powder. By adjusting the powder mix in terms of both particle size and shape the performance characteristics of a given electrochemical cell can be optimized (Paragraph 0084). The fine air atomized powder has a particle size distribution were 100% of the particles are less than 75 \square m and the conventional air atomized powder has a particle size distribution within 425 \square m and 54 \square m (Paragraph 0085).

Malservisi et al do not disclose discharging and OCV data. However, it is the position of the examiner that such properties are inherent, given that Malservisi et al and the present application utilize zinc powders with the same particle sizes and tap

density and with same materials with the same composition. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to the BET surface area being greater than $400 \text{ cm}^2/\text{g}$, Malservisi et al do not disclose BET specific surface area data. However, Tada et al. recognize the benefit of changing the surface area of zinc particles. Tada et al. disclose zinc alkaline cells (title) wherein If the bulk specific gravity of the zinc alloy powder would be less than 2.90 (grams per cm.sup.3), on the one hand, the action of suppressing gases from generating may be reduced because the shapes of the zinc alloy powder particles may become so nearly acicular that the specific surface area of the zinc alloy powder particles becomes large enough to make their reactivity too high. If the bulk specific gravity thereof would be larger than 3.50 (grams per cm.sup.3), on the other hand, the discharge performance may be lowered because the shapes of the zinc alloy powder particles become so nearly spherical that their surface area becomes smaller, thereby making their reactivity too low (Col 2 lines 40-54). Therefore, it would have been within the skill of the ordinary artisan to change the surface are of the zinc particles of Malservisi et al. such that the surface area is within the range of that claimed by applicant in order to provide sufficient reactivity. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

With respect to claims 48, 49 and 50, Malservisi et al. teach that two varieties of gelled anodes were fabricated, the first comprising 67% by weight zinc powder and 33% by weight gelled electrolyte and the second comprising 62% by weight zinc powder and 38% by weight gelled electrolyte. The control anode was fabricated from 67% by weight zinc powder and 33% by weight of gelled electrolyte. The gelled electrolyte comprised 98% by weight of KOH 40%/ZnO 3% and 2% by weight of polyacrylic acid (Carbopol TM 940) as gelling agent (Paragraph 0080-0081).

$$\rho_{\text{(Zinc)}} = 7.14\text{g/cc}, \rho_{\text{(KOH 40\%)}} = 1.39\text{g/cc}, \rho_{\text{(ZnO)}} = 5.6\text{g/cc}, \rho_{\text{(Carbopol 940)}} = 1.41\text{g/cc}$$

Basis = 100g anode material

$$\text{Volume Zn} = 62\text{g} / \rho_{\text{(Zinc)}} = 8.6\text{cc}, \text{Volume KOH} = (0.98 * 38\text{g}) / \rho_{\text{(KOH)}} = 27.9\text{cc}$$

$$\text{Volume Carbopol 940} = (0.02 * 38\text{g}) / \rho_{\text{(carbopol 940)}} = 0.54\text{cc}$$

$$\text{Volume \% Zinc} = (\text{Vol zn} / \square \text{Vol}) \times 100 = 23.2 \text{ vol \% zinc}$$

Claims 5-8, 14-15, 26-29, 32-34, 37-39 and 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malservisi et al. (U.S. Pub. No. 2004/0115532 A1) in view of Tada et al. (U.S. Patent No. 6,436,539 B1) and further in view of Amacanqui et al. (U.S. Pub. No. 2004/0033418).

With respect to claims 5-7, 26-29, 32-34, 37-39, Malservisi et al. as modified by Tada et al. disclose zinc powders for use in electrochemical cells (title) in paragraphs 2

and 7 above. Malservisi et al. as modified by Tada et al. do not specifically teach using potassium hydroxide solution that is 36%, 34% or 32% by weight potassium hydroxide. However, Armacanqui et al. discloses an alkaline cell with performance enhancing additives (title) wherein, Armacanqui et al. teach that the present invention recognizes that advantages may be achieved in a cell whose electrolyte has a concentration of 30% to 40%. Furthermore, as is discussed in more detail below, cell performance may be enhanced using an anode gel having a KOH concentration between 20% and 30% (Paragraph 0041). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made use the electrolyte of Armacanqui et al. in the battery of Malservisi et al. as modified by Tada et al. because Armacanqui et al. teach that cell performance is particularly enhanced when the KOH concentration is between 30% and 40% (Paragraph 0044).

With respect to claim 8, Malservisi et al. teach the use of a battery grade zinc powder comprising stranded particles fabricated from a zinc metal, the stranded particles having a tap density of at most about 3.2 g/cc, preferably at most about 2.8 g/cc (Paragraph 0015). Malservisi et al. teach that two varieties of gelled anodes were fabricated, the first comprising 67% by weight zinc powder and 33% by weight gelled electrolyte and the second comprising 62% by weight zinc powder and 38% by weight gelled electrolyte. The control anode was fabricated from 67% by weight zinc powder and 33% by weight of gelled electrolyte. The gelled electrolyte comprised 98% by

weight of KOH 40%/ZnO 3% and 2% by weight of polyacrylic acid (Carbopol TM 940) as gelling agent (Paragraph 0080-0081).

Malservisi et al do not disclose resistivity data. However, it is the position of the examiner that such properties are inherent, given that Malservisi et al and the present application utilize the same materials and same anode composition. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

6. With respect to claims 14-15 and 45-46, the disclosure Malservisi et al as modified by Tada et al. differs from Applicant's claims in that Malservisi et al. as modified by Tada et al. do not disclose that D_{50} is between 100 and 130 μm or between 110 and 120 μm . However, Malservisi et al. as modified by Tada et al. recognize that adjusting the powder mix in terms of both particle size and shape the performance characteristics of a given electrochemical cell can be optimized (Paragraph 0084).

Improved performance characteristics may also be derived from mixtures of the above produced zinc alloy powders. A given mixture is comprised of two or more types of zinc powders made by impulse atomization or by impulse atomization and conventional techniques and having different particle shapes and/or particle sizes distributed around different mean particle sizes which are then combined to form a hybrid powder. By adjusting the powder mix in terms of both particle size and shape the performance characteristics of a given electrochemical cell can be optimized

(Paragraph 0084). The fine air atomized powder has a particle size distribution were 100% of the particles are less than 75 μ m and the conventional air atomized powder has a particle size distribution within 425 μ m and 54 μ m (Paragraph 0085).

. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use zinc particles where D₅₀ is between within the applicants claimed particle size range in order improve the performance of the electrochemical cell. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

(10) Response to Argument

Applicants argue that: All of the pending claims require the zinc powder to have a specific surface area greater than 400 cm²/g. The Examiner cited the combination of Malservisi and Tada to reject the independent claims based on obviousness. The Examiner reasoned that one having ordinary skill in the art would have changed the specific surface area of the zinc particles of Malservisi as taught by Tada to provide sufficient reactivity. (Final Office Action, p. 4). Appellants respectfully submit that the Tada reference does not disclose a zinc powder with a specific surface area greater

than 400 cm²/g. The portion of the Tada reference cited by the Examiner does not contain an express disclosure of a numeric range of specific surface area. The cited portion only expressly teaches a numeric range of bulk specific gravity, namely a range between 2.90 g/cm³ and 3.50 g/cm³. However, bulk specific gravity is a completely different measurement than specific surface area, as evidenced by their units of measurement. Bulk specific gravity is expressed as g/cm³ whereas specific surface area is expressed in cm²/g. These measurements do not necessarily directly correlate. Accordingly, the Examiner has not adequately articulated a reason as to why one having ordinary skill in the art would have modified the bulk specific gravity disclosure of the Tada reference to arrive at the claimed limitation of specific surface area. For this reason, Appellants assert that the Examiner has not articulated a prima-facie case of obviousness.

In response: With respect to the BET surface area being greater than 400 cm²/g, Malservisi et al do not disclose BET specific surface area data. However, Tada et al. recognize the benefit of changing the surface area of zinc particles. Tada et al. disclose zinc alkaline cells (title) wherein If the bulk specific gravity of the zinc alloy powder would be less than 2.90 (grams per cm.sup.3), on the one hand, the action of suppressing gases from generating may be reduced because the shapes of the zinc alloy powder particles may become so nearly acicular that the specific surface area of the zinc alloy powder particles becomes large enough to make their reactivity too high. If the bulk specific gravity thereof would be larger than 3.50 (grams per cm.sup.3), on the other hand, the discharge performance may be lowered because the shapes of the

zinc alloy powder particles become so nearly spherical that their surface area becomes smaller, thereby making their reactivity too low (Col 2 lines 40-54). Therefore, it would have been within the skill of the ordinary artisan to change the surface area of the zinc particles of Malservisi et al. such that the surface area is within the range of that claimed by applicant in order to provide sufficient reactivity. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art. In re Boesch*, CCPA 1980, 617 F.2d 272, 205 USPQ215. (Examiner notes that Tada et al. teach a direct relationship between the surface area of zinc particles and their reactivity. Therefore it is within the skill of one of ordinary skill in the art to adjust the surface area of zinc particles to achieve a desired reactivity given this teaching of Tada et al.)

Claims 4 and 48-51 contain the limitation that "the volume of zinc is no greater than 24.0% of the second electrode's volume." In the Final Office Action, the Examiner represented that the Malservisi reference teaches a zinc powder occupying 23.2 volume percent of the second electrode's volume. (Final Office Action, p. 3). However, appellants independently calculated the amount of zinc powder disclosed in Malservisi to be 24.7 volume percent. Appellants respectfully assert that the Examiner appears to have miscalculated the volume percent of zinc powder for multiple reasons. First, it appears that the Examiner's calculation does not take into account the correct density for KOH. The density which is used in the Examiner's calculations is the density of KOH

in solution. If the Examiner wanted to separately calculate KOH, then the Examiner should have used the density of KOH as a solid, which is about 2.04 g/cc.² Second, even if the Examiner had used the density of solid KOH, which the Appellants also assert is incorrect, then the calculation still would have been incorrect. In combining a solid into a liquid solution, the volumes of the two components are not necessarily additive, since the solid may dissolve into the solution. In this case, where KOH is added to a solution, the KOH will dissolve into the solution. In the Examiner's calculation, the Examiner combined the volume of KOH as if none of it had dissolved into the solution. Since the Examiner has not cited any references which teach an electrochemical cell comprising zinc powder occupying less than 24.0 volume percent of the second electrode's volume, Appellants further submit that the Examiner has not established a prima facie case of obvious for at least claims 4 and 48-51. Thus, for at least this additional reason, Appellants assert that claims 4 and 48-51 are allowable over the cited references.

In response: The use of the density of KOH in solution and not the density of solid KOH in the Examiner's calculation accounts for the fact that solid KOH is dissolved and in solution. The density of KOH in solution was used because KOH is in solution in the cell of Malservisi et al.

For the above reasons, it is believed that all the rejections should be sustained.

(11) *Related Proceedings Appendix –37 C.F.R. 41.37 (c)(1)(x)*

There are no related proceedings to this Appeal.

Respectfully Submitted,

/Ben Lewis/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795
Patrick J. Ryan
SPE, Art Unit 1795

/William Krynski/
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